GUIDE LINE TO VENDOR REGARDING TUBE LAYOUT PREPARATION

REV.	DATE	REVISIONS	BY	CHECKED BY	APPROVED BY
0	23-07-01	ISSUED AS JOB SPECIFICATION			

SCOPE

Vendor shall develop detailed tube layout drawings based on the tube layouts, the guidelines given below and other attachments of the specification. Contractor can proceed with drilling of tubesheets, baffles, support plates only after the detailed tube layout drawings have been reviewed by EIL in writing. Any conflict between the tube layout/guidelines/other requirements of the requisition shall be brought to EIL's notice and EIL's decision on the same shall be final and binding on the vendor without any cost/time implication after the order.

GUIDELINES

1. Sealing strips shall be as indicated on the drawings. Sealing strips minimum width to be 25mm, however minimum clearance between tube OD to sealing/sliding strip to be 5 mm. The actual width of the sealing strips to be calculated based on a minimum clearance of 5mm between tube OD and the baffle OD. The sealing strips shall extend from first to last baffle unless when they are required to hold the bundle (i.e. there is no tie rod placed within 50 mm distance of the sealing strip), in which case they shall extend from stationary tubesheet to last support plate. Ensure that sealing strips/tie rods do not obstruct nozzle opening. Attachment to stationary tubesheet shall be as per EIL Standard 7-15-007. Sealing strip thickness shall be 8 mm (min). However the sealing strip thickness shall not be less than twice corrosion allowance. Sealing strips shall extend upto baffle OD and shall not be extended upto shell ID.

2. Impingement plate shall be held by tie rods/sealing strips/sliding strips. Extra tie rods shall be provided if necessary to hold the impingement plate. Impingement plate may be welded to shell in fixed tubesheet exchangers only. In such case impingment plate in material shall be same as that of shell. Width of impingement plate shall be as indicated int he tubelayout. Length of implingement plate along the shell, if not specified in the Setting Plan drawing shall be taken as nozzle OD + 50mm.

3. In case of 45° & 90° tube patterns, through clear lanes shall be provided for cleaning outside of tubes and no tie rod, seal strip/seal rod/sliding strip shall interface with these lanes.

4. The notches in baffle for sealing strips/sliding strips shall be the strip thickness + 0.5mm.

5. Width of sliding strips to be maximum keeping a gap of 5 mm between the tube and sliding strip. However, minimum thickness & width of sliding strip shall be as given in Table-1. Any change in minimum width and thickness shall be brought to EIL's notice and EIL's decision shall be final. The slidiing strip shall extend from last support plate to stationary tubesheet. Attachment of sliding strip to tubesheet shall be as per EIL STD' 7-15-007. To facilitate bundle insertion/withdrawl a maximum of 0.8mm clearance between the shell ID and sliding strip to be provided..

6. For removable bundles, eye bolts shall be provided on the channel side face of stationary tubesheet and located approximately diametrically opposite. In case of four eye bolts, these shall be spaced along the circumference of tube sheet at approximately diametrically opposite ends. For cladded tubesheets on channel side, alloy base plugs as per standard drawings shall be used. Eye bolt size shall be as per EIL Standard 7-15-0008 and shall be selected based on a bundle pulling force of 1.5 times bundle weight. Eye bolt holes shall not be drilled through the tubesheet thickness. Location to be such as to distribute loads on tube sheet evenly.

7. The ligament between eye bolt hole edge and tubesheet edge/tube hole shall be minimum 6 mm.

8. For 'S' & 'T' type exchangers, support plate shall be provided with maximum cuts at top & bottom to clear top/bottom row of tubes and encompassing full width of the sliding strips. The window cut in the middle shall be such that at least 50% of the total number of tubes are supported. The minimum ligament between the tube OD (top/ bottom row) and the support plate cut shall be 15 mm.

In case of `U' tube exchangers, the support plate, if required near `U' bend, shall be located on the straight length portion, 50 mm from tangent line of `U' tubes.

For `G', `H' type exchangers, support plates shall be provided at the centreline of shell nozzle and shall be provided with notches as indicated below.

For `K' type exchangers, full support plates without cuts and notches shall be provided at a spacing not exceeding 85% of the maximum unsupported tube length given in TEMA.

9. Pass lane width given in the tube layout are from tube centre to tube centre across the pass partition lane.

10. The dome height specified in the tube layouts is the minimum distance to be maintained from shell ID to the top of impingement plate (or top of tube if there is no impingement plate).

11. Baffles/support plates shall be provided with 90^0 top and bottom notches with width given below:

Shell ID (mm)	Notch width (mm)
Less than 300	6
300 to 600	10
greater than 600	12

12. Where tie-rods have been considered without spacers, then tie-rods shall be welded to baffles/support plate.

13. For LAS tubesheets, do not weld any attachment like sealing strips, dowel lugs/jack screw lugs to tube sheet. These shall be attached by screw connections.

TABLE - 1

MINIMUM SIZE OF SLIDING STRIPS

Shell ID (mm)	Width (mm)	Thickness (mm)
Less than 432	--	--
433 to 812	50	16
813 to 1092	60	18
1093 to 1524	70	20
1525 & above	100	25